Ecosystem Socioeconomic Profile (ESP)

GOA Pollock
(Report Card)

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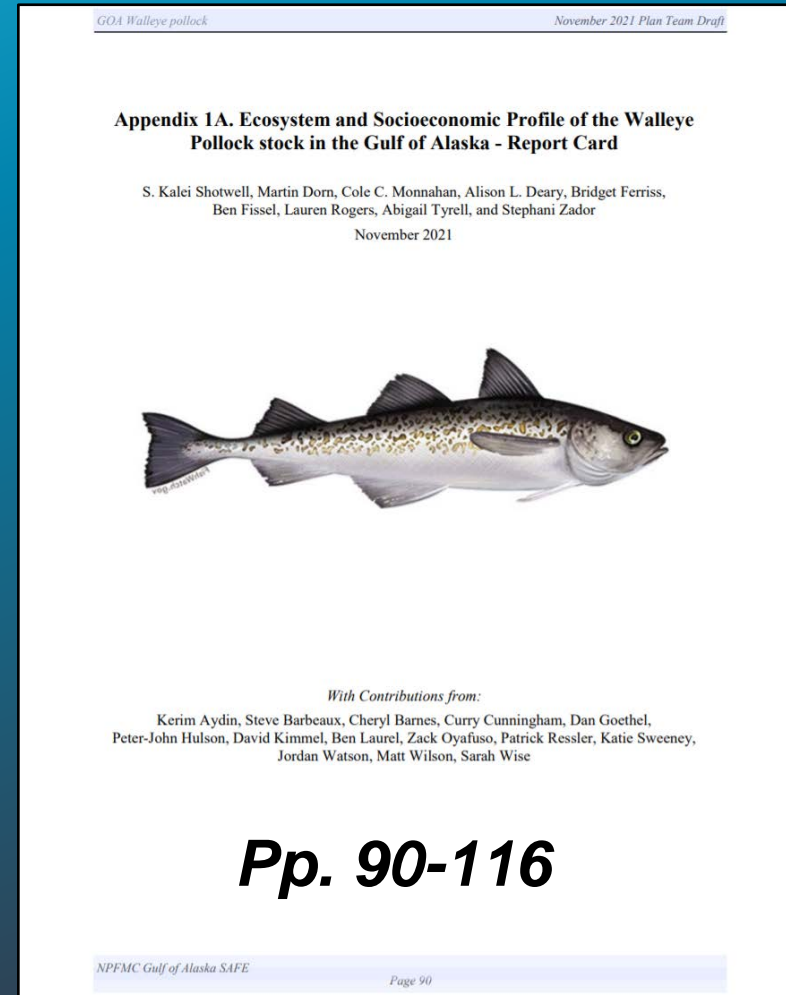
NOAA FISHERIES

Overview

Appendix in SAFE report

- Full ESP in 2019

- Partial ESP in Nov 2020

- Report card in Nov 2021

  - Simplified template allows for including current year data

  - Some indicators missing due to cancellations, data timing

- 9 editors, 14 contributors

GOA Walleye pollock   *November 2021 Plan Team Draft*

Appendix 1A. Ecosystem and Socioeconomic Profile of the Walleye Pollock stock in the Gulf of Alaska - Report Card

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Pp. 90-116

NPFMC Gulf of Alaska SAFE   *Page 90*

ESP Report Card Template

Stock/Complex:

Outline for Ecosystem and Socioeconomic Profile (ESP)

Current Year Update (Report Card)

- ❑ Short description of an ESP process and reference to full ESP

Management Considerations

- ❑ Summary ecosystem and socioeconomic considerations from the assessment for use in the main stock assessment

Modeling Considerations

- ❑ Summary of intermediate stage importance results and research ecosystem linked model status

Assessment

Ecosystem and Socioeconomic Processes

- ❑ Short description of ecosystem and socioeconomic processes from full or partial ESP with conceptual models
- ❑ Table of data sources, key processes affecting survival, conceptual model graphics

Indicator Suite

- ❑ List of ecosystem and socioeconomic indicator titles with standard time series graph

Indicator Monitoring Analysis

- ❑ Beginning stage traffic light test with comparison table and historical scoring by ecosystem and socioeconomic indicators

- ❑ Intermediate stage importance test with covariate graph, direction, magnitude, and importance results (optional)
- ❑ Advanced stage research model update with reference to developed model and supportive graphs (optional)

Data Gaps and Future Research Priorities

- ❑ Description of metric or indicator data gaps and needs
- ❑ Priorities for ecosystem and socioeconomic research that would support future versions of the ESP
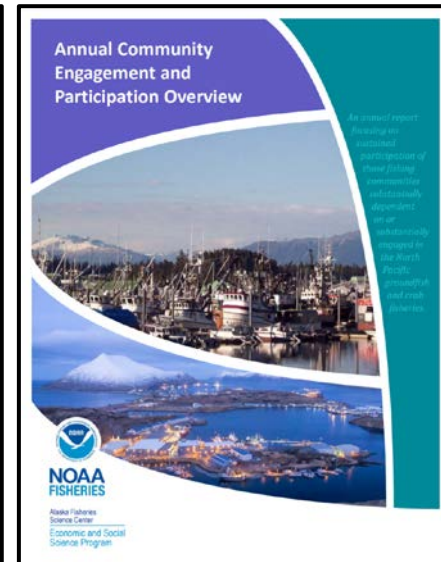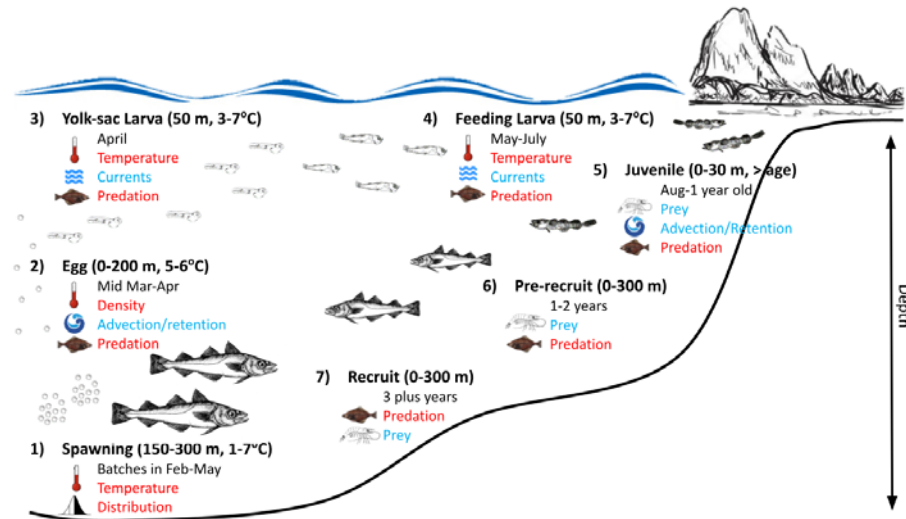
Acknowledgements & Literature Cited

Processes

- Ecosystem
  - Short summary of life history, similar to ESR risk categories
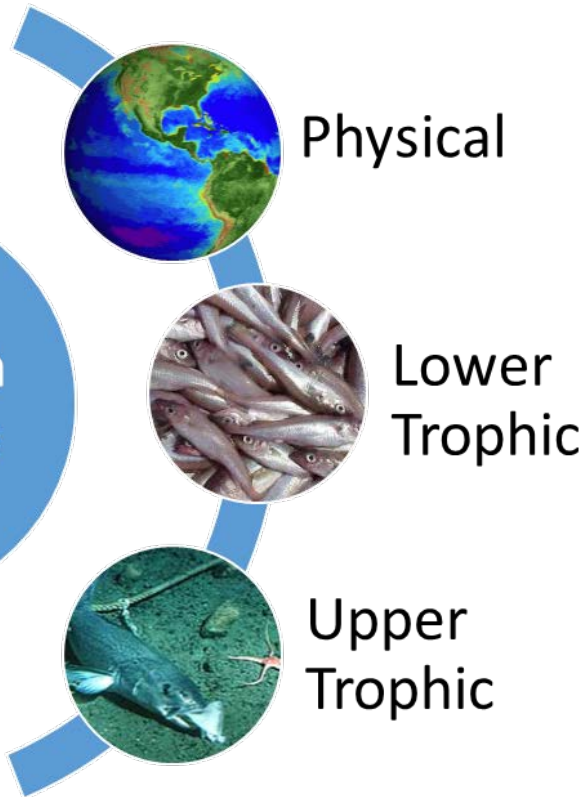 - Includes conceptual model for reference

- Socioeconomic
  - Pared down EPR, focus on stock health, fishery behavior
  - Reference but not redundant with Econ SAFE or ACEPO

Ecosystem Indicators

Physical

Lower Trophic

Upper Trophic

Ecosystem Indicators

- − 1. Annual Marine heatwave index (model)
- − **2. Bottom temperature (trawl survey)**
- − **3. Sea surface temperature (satellite)**
- − **4. Spring wind direction (buoy data)**
- + 5. Chlorophyll *a* biomass, (satellite)
- + **6. Spring bloom peak timing (satellite)**
- + 7. Spring, summer copepods (EcoFOCI)
- + 8. Euphausiids (acoustic backscatter)
- + 9. Auklet reproductive success Chowiet
- + **10. Pollock larvae**, YOY, condition (EcoFOCI)
- + **11. Nearshore pollock CPUE (Kodiak)**
- + 12. Pollock relative biomass Aiktak puffin
- − 13. Pollock predation estimate age-1 (model)
- + **14. Pollock euphausiid in diet (survey)**
- + **15. Fall fishery, winter survey condition**
- − + **16. COG northeast, area occupied (VAST)**
- − 17. ATF, **POP, Sablefish** total biomass (model)
- − 18. Adult Steller sea lions counts (survey)

Socioeconomic Indicators

Socio-economic Indicators

Fishery Performance

1. **Winter, spring CPUE fishery**
2. **Summer, fall CPUE fishery**

Economic

3. **Ex-vessel price per pound**
4. **Roe per unit catch**

Community

5. Processing RQ Kodiak
6. Harvesting RQ Kodiak
7. Processing RQ small comm.
8. Harvesting RQ Sand Point

Indicator Monitoring Analysis

Beginning Stage

Traffic Light

- Historical simple score (SSC)
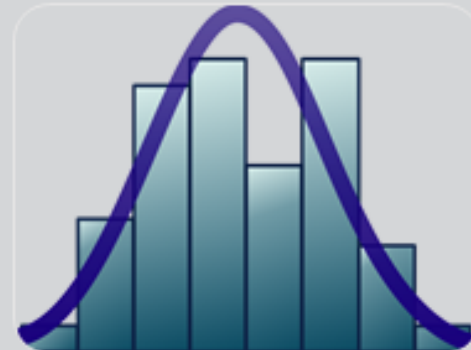- Current year trends relative to mean of series
- Evaluate whole suite utility

Intermediate Stage

Importance

- Regression R^2
- Direction, magnitude, uncertainty, inclusion weight
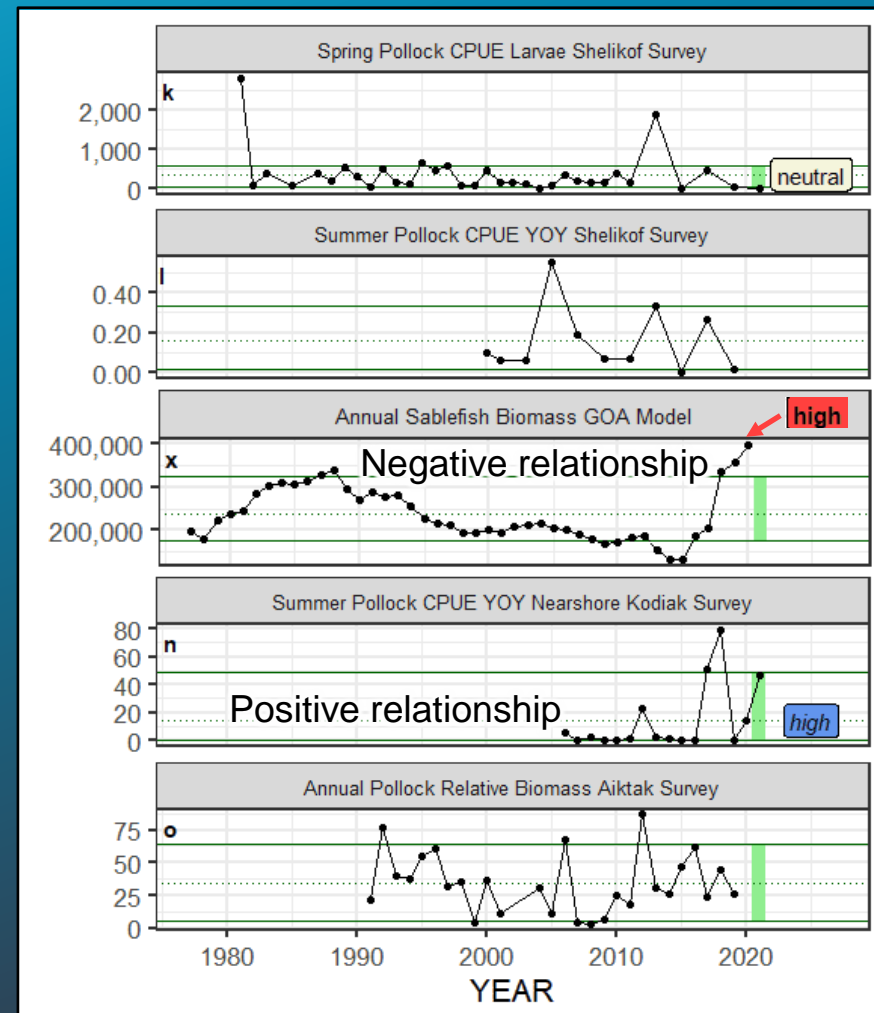- Prediction performance

Advanced Stage

Ecosystem Model Run

- Comparison w/ operational
- Retrospective
- Prediction performance
- Terminal SSB

Traffic Light

- Time series and Table
  - Historical time series of indicators suite (~ starts 1977)
  - Evaluate a given year 1 stdev from the long term mean
  - High (H), low (L), neutral (N), color is relationship with stock
- Summary Score
  - Score by category last 20 yrs
  - Sum of H, L, N, color is -1,1

Negative relationship

Positive relationship

Traffic Light Table

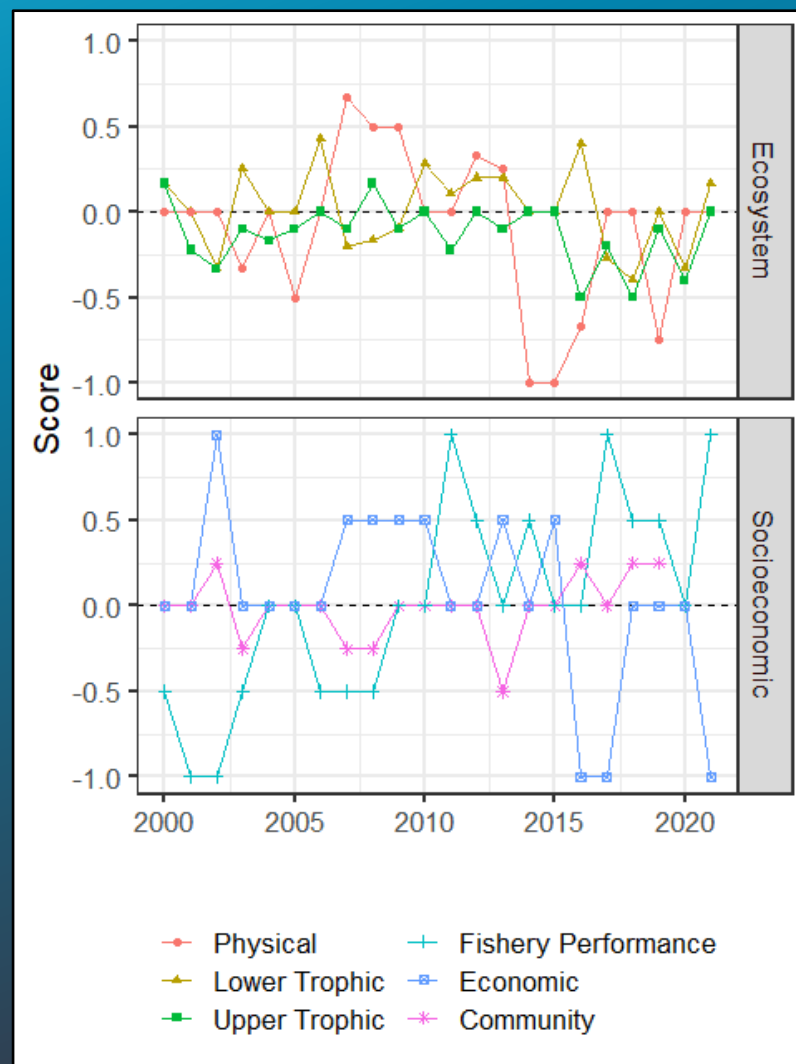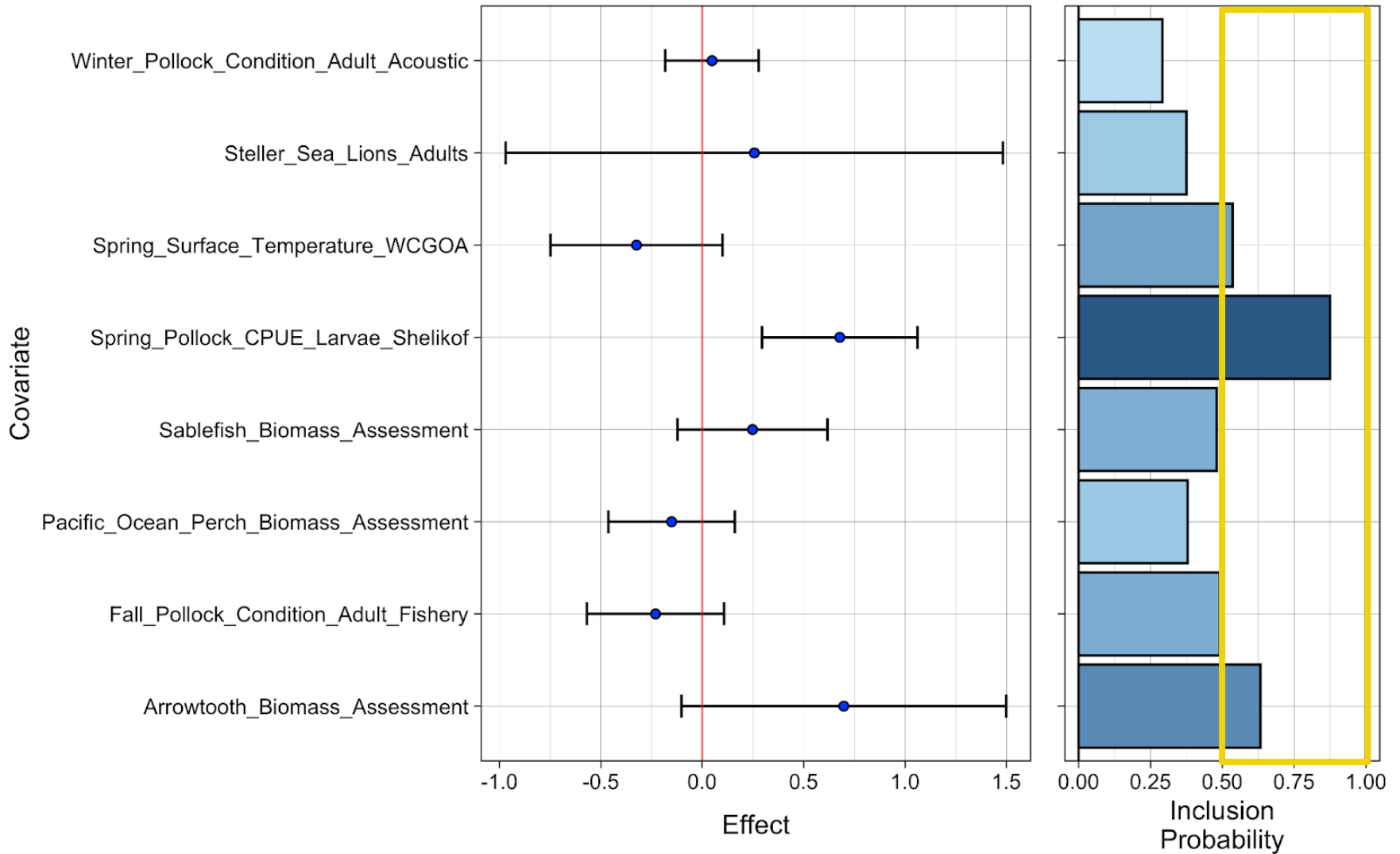| Category	Indicator	2017 Status	2018 Status	2019 Status	2020 Status	2021 Status
Physical	Annual Heatwave GOA Model	neutral	neutral	**high**	neutral	neutral
	Spring Temperature Surface WCGOA Satellite	neutral	neutral	**high**	neutral	neutral
	Summer Temperature Bottom GOA Survey	neutral	NA	**high**	NA	neutral
	Spring Wind Direction Kodiak Buoy	neutral	NA	neutral	neutral	neutral
Lower Trophic	Spring Chlorophylla Biomass WCGOA Satellite	**low**	**low**	**low**	neutral	neutral
	Spring Chlorophylla Peak WCGOA Satellite	**low**	**low**	*high*	**low**	neutral
	Spring Small Copepod Abundance Shelikof Survey	neutral	NA	*high*	NA	neutral
	Summer Large Copepod Abundance Shelikof Survey	**low**	NA	neutral	NA	NA
	Summer Euphausiid Abundance Kodiak Survey	**low**	NA	neutral	NA	NA
	Annual Auklet Reproductive Success Chowiet Survey	neutral	**low**	neutral	NA	neutral
	Spring Pollock CPUE Larvae Shelikof Survey	neutral	NA	neutral	NA	neutral
	Summer Pollock CPUE YOY Shelikof Survey	neutral	NA	neutral	NA	NA
	Summer Pollock Condition YOY Shelikof Survey	neutral	NA	**low**	NA	NA
	Summer Pollock CPUE YOY Nearshore Kodiak Survey	*high*	*high*	neutral	neutral	*high*
	Annual Pollock Relative Biomass Aiktak Survey	neutral	neutral	neutral	NA	NA
Upper Trophic	Summer Pollock MT Consumed Age1 GOA Model	neutral	NA	neutral	NA	NA
	Summer Pollock Euphausiid Diet Juvenile GOA Survey	neutral	NA	*high*	NA	neutral
	Fall Pollock Condition Adult GOA Fishery	neutral	neutral	neutral	neutral	NA
	Winter Pollock Condition Adult GOA Survey	**low**	**low**	neutral	neutral	neutral
	Summer Pollock Center Gravity Northeast WCGOA	*low*	NA	neutral	NA	neutral
	Summer Pollock Area Occupied WCGOA Model	**low**	NA	neutral	NA	neutral
	Annual Arrowtooth Biomass GOA Model	neutral	neutral	neutral	neutral	NA
	Annual Pacific Ocean Perch Biomass GOA Model	**high**	**high**	**high**	**high**	NA
	Annual Sablefish Biomass GOA Model	neutral	**high**	**high**	**high**	NA
	Annual Steller Sea Lion Adult GOA Survey	neutral	neutral	neutral	NA	NA

Traffic Light Table

Category	Indicator	2017 Status	2018 Status	2019 Status	2020 Status	2021 Status
Fishery Performance	Winter Spring Pollock CPUE Adult GOA Fishery	*high*	*high*	*high*	neutral	*high*
	Summer Fall Pollock CPUE Adult GOA Fishery	*high*	neutral	neutral	neutral	NA
Economic	Annual Pollock Real Exvessel Price Fishery	**low**	neutral	neutral	neutral	NA
	Winter Spring Pollock Roe Per Unit Catch Fishery	**low**	neutral	neutral	neutral	**low**
Community	Annual Pollock RQ Harvesting Revenue Kodiak Fishery	*high*	*high*	*high*	NA	NA
	Annual Pollock RQ Processing Revenue Kodiak Fishery	neutral	*high*	*high*	NA	NA
	Annual Pollock RQ Harvesting Revenue Small Communities GOA Fishery	**low**	**low**	**low**	NA	NA
	Annual Pollock RQ Processing Revenue Small Communities GOA Fishery	neutral	neutral	neutral	NA	NA

Traffic Light Score

- Ecosystem (16 of 25 total)
  - Physical remains average
  - Lower trophic > to above average
  - Upper trophic > to average
- Socioeconomic (4 of 8 total)
  - Fishery perf > to above average
  - Economic low in 2021 due to roe catch very low, 2020 average
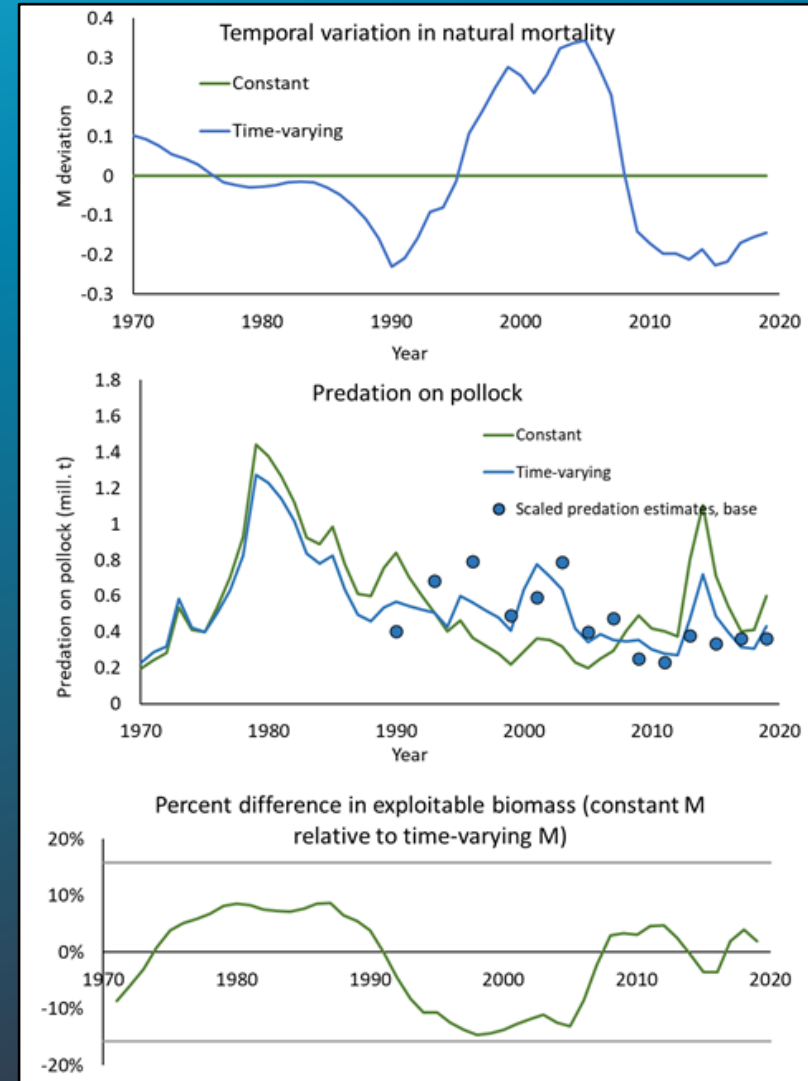- 20 of 33 indicators updated

Importance

Ecosystem Linked Model

- Exploratory model
  - Uses RACE diet data and stock assessment data of predators
  - Total predation index (not just a_1)
  - Within stock assessment model
- Preliminary results
  - M ranged from 40% above to 20% below the mean (mostly ATF)
  - Improved survey fit, exploitable biomass differed by 15%

Temporal variation in natural mortality

Predation on pollock

Percent difference in exploitable biomass (constant M relative to time-varying M)

Considerations

- Management Summary

  - Cooling overall, transport to suitable habitat, later peak

  - Larvae low, nearshore YOY high, sufficient prey

  - Condition average, slight shift in distribution and spread

  - More competitors in system with sablefish and POP

  - Fishery CPUE high, low price and roe catch

- Modeling Summary

  - 3 potential covariates for GOA pollock recruitment

  - New research ecosystem linked model of predation

Next Steps

- 2022 Request for Indicators (RFI)
    - Use ESP data gaps and research priorities
    - ESP team creates RFI in Jan
    - Indicators submitted and reviewed in Feb
    - If new indicators, then initiate partial ESP
- 2022 ESP
    - If partial, in Sept and evaluate current community indicator categories (SSC)
    - Report card of current data in Nov

Questions?

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